

**WHAT IS CLAIMED IS:**

1. A multiple stage currency processing system, comprising:
  - a first currency processing stage including a plurality of first stage currency processing devices having at least one output receptacle, each of the first stage currency processing devices being adapted to denominate currency bills received in the first stage, the first stage being adapted to output a plurality of first batches of currency bills processed in the first stage, each first batch having an associated first total corresponding to the value of the currency bills in the respective first batch;
  - a second currency processing stage for receiving first batches from the first stage, the second stage including at least one second stage currency processing device having a plurality of output receptacles, the at least one second stage currency processing device being adapted to denominate currency bills and to sort currency bills into the plurality of output receptacles, the at least one second stage device adapted to determine a second total associated with each first batch processed by the at least one second stage device, the second total corresponding to the value of the currency bills in the first batch processed by the at least one second stage device, the second stage being adapted to output a plurality of second batches of currency bills processed in the second stage, each second batch having an associated third total corresponding to the value of the currency bills in the respective second batch;
  - a third currency processing stage for receiving the second batches from the second stage, the third stage having a plurality of third stage currency processing devices having at least one output receptacle, each third stage device being adapted to count currency bills and to suspend operation when a predetermined number of currency bills are transported to the at least one output receptacle, the third stage devices being adapted to determine a fourth total associated with each second batch processed by the third stage devices, each fourth total corresponding to the value of the currency bills in the respective second batch processed by third stage devices; and
  - a central processing unit interfaced with each of the first, second, and third stage currency processing devices, the central processing unit adapted to receive information from each of the first, second, and third stage currency processing devices, the central processing unit being adapted to compare first totals to second totals, the central processing unit being adapted to compare third totals to fourth totals.

2. The system of claim 1 wherein each of the first stage devices includes an operator interface adapted to receive information from an operator of the first stage device.

5 3. The system of claim 1 wherein the central processing unit is adapted to control the operation of the at least one second stage currency processing device, the operator interface being adapted to receive information from an operator of the second stage currency processing device.

10 4. The system of claim 1 wherein each of the third stage devices includes an operator interface adapted to receive information from an operator of the third stage device.

5 5. The system of claim 1 wherein each second batch corresponds to the  
15 currency contained in a storage cassette associated with one of the plurality of the output receptacles of the second stage device.

6. The system of claim 1 wherein the controller is adapted to record the operator associated with the processing of each first batch.  
20

7. The system of claim 1 wherein the controller is adapted to record the first stage device associated with the processing of each first batch.

8. The system of claim 1 wherein each first batch corresponds to all of the  
25 currency processed by a particular first stage device during a specific time period.

9. The system of claim 8 wherein the time period is one day.

10. The system of claim 8 wherein the time period corresponds to a work  
30 shift of an operator of a particular first stage device.

11. The system of claim 1 wherein a first batch corresponds to all of the currency deposited by a specific customer.

12. The system of claim 1 wherein the central processing unit is adapted to generate an error signal when a second total does not favorably compare to a first total.

13. The system of claim 1 wherein the central processing unit is adapted to  
5 generate an error signal when a third total does not favorably compare to a fourth total.

14. The system of claim 1 wherein the at least one second stage currency processing device sorts currency bills according to denomination.

10 15. The system of claim 1 wherein the plurality of the third stage devices are adapted to determine the denomination of the currency bills.

16. The system of claim 15 wherein each of the plurality of third stage devices includes an operator interface adapted to receive input from an operator  
15 specifying a currency denomination to be processed.

17. The system of claim 16 wherein each of the plurality of third stage devices are adapted to generate a stranger error signal when a determined denomination of a currency bill does not match the specified denomination.

20

18. The system of claim 16 wherein the third stage devices have two output receptacles, each of the third stage devices being adapted to suspend operation upon generation of a stranger error signal.

25 19. The system of claim 16 wherein the third stage devices have a single output receptacle, each of the third stage devices being adapted to suspend operation upon generation of a stranger error signal.

20. The system of claim 1 wherein at least one of the plurality of first stage  
30 devices has two output receptacles.

21. The system of claim 1 wherein at least one of the plurality of first stage devices has a single output receptacle.

22. The system of claim 1 wherein at least one of the plurality of the first stage devices is adapted to evaluate the authenticity of currency bills.

23. The system of claim 1 wherein the at least one second stage device is  
5 adapted to evaluate the authenticity of currency bills.

24. The system of claim 1 wherein at least one of the plurality of third stage devices is adapted to evaluate the authenticity of currency bills.

10 25. A method for processing currency bills with a multiple-stage currency processing system comprising a first stage including a plurality of first stage currency processing devices having at least one output receptacle, a second currency processing stage including at least one currency processing device having a plurality of output receptacles, and a third currency processing stage including a plurality of currency  
15 processing devices having at least one output receptacle, the method comprising:

receiving currency bills to be processed in the first currency processing stage;  
denominating the received currency bills with one or more of the first stage devices;

grouping currency bills denominated by the one or more first stage devices  
20 into a plurality of first batches, each first batch having an associated first total corresponding to the value of currency bills in the first batch;

receiving one or more of the first batches from the first currency processing stage in the second currency processing stage;

denominating the currency bills of each received first batch with the at least  
25 one second stage currency processing device;

determining a second total for each received first batch with the at least one second stage currency processing device, the second total corresponding to the value of the currency bills in the first batch;

comparing the first total to the second total;

30 sorting currency bills of each received first batch with the at least one second stage currency processing device into a plurality of second batches, each second batch having an associated third total corresponding to the value of currency bills in the second batch,

receiving one or more second batches in the third currency processing stage;

counting the currency bills of each received second batch with one or more of the plurality of third stage currency processing devices;

determining a fourth total for each received second batch with the one or more third stage currency processing devices, the fourth total corresponding to the value of the currency bills in the second batch; and  
5 comparing the third total to the fourth total.

26. The method of claim 25 further comprising receiving information from an operator of a first stage currency processing device via an operator interface.

10

27. The method of claim 26 wherein the information is selected from the group consisting of a customer account number, a customer name, date, time, and a declared deposit amount.

15

28. The method of claim 25 further comprising interfacing each of the plurality of first stage currency processing devices, the at least one second stage currency processing device, and each of the plurality of third stage currency processing devices with a central processing unit.

20

29. The method of claim 28 wherein the central processing unit is adapted to receive information from each of the plurality of first stage currency processing devices, the at least one second stage currency processing device, and each of the plurality of third stage currency processing devices.

25

30. The method of claim 25 wherein the plurality of second batches correspond to the plurality of output receptacles of the at least one second stage currency processing device.

30

31. The method of claim 25 wherein sorting further comprises sorting according to denomination.

32. The method of claim 25 wherein grouping further comprises grouping according to a predetermined criteria selected from the group consisting of an operator of the first stage currency processing devices, a specific first stage device, currency

processed by a first stage device during a specific time period, and customer identification.

33. The method of claim 25 further comprising generating an error signal  
5 when a second total does not favorably compare to a first total.

34. The method of claim 25 further comprising generating an error signal  
when a third total does not favorably compare to a fourth total.

10 35. The method of claim 25 wherein counting the bills further comprises  
determining the denomination of each of the currency bills with the one or more of the  
plurality of third stage currency processing devices.

36. The method of claim 25 further comprising receiving input from an  
15 operator of the one or more third stage currency processing devices via an operator  
interface specifying a currency denomination to be processed.

37. The method of claim 36 wherein the one or more third stage devices are  
adapted to generate a stranger error signal when a determined denomination of a  
20 currency bill does not match the specified denomination.

38. The method of claim 37 wherein the one or more third stage device has  
two output receptacles, the one or more third stage device being adapted to suspend  
operation upon generation of the stranger error signal.

25 39. The method of claim 37 wherein the one or more third stage device has  
two output receptacles, the one or more third stage device being adapted to off-sort the  
currency bill triggering the stranger error signal.

30 40. The method of claim 37 wherein the one or more third stage device has a  
single output receptacle, the one or more third stage device being adapted to suspend  
operation upon generation of the stranger error signal.

41. The method of claim 25 wherein at least one of the plurality of first stage devices has two output receptacles.

42. The method of claim 25 wherein at least one of the plurality of first stage  
5 devices has a single output receptacle.

43. The method of claim 25 further comprising evaluating the authenticity of the currency bills with one or more of the first stage currency processing devices.

10 44. The method of claim 25 further comprising evaluating the authenticity of the currency bills of each received first batch with the at least one second stage currency processing device.

45. The method of claim 25 further comprising evaluating the authenticity of  
15 the currency bills of each received second batch with one or more of the plurality of third stage currency processing devices.

46. A currency processing system having three stages, comprising:  
a first stage including a plurality of compact currency handling devices  
20 adapted to denominate and count currency bills, the compact devices having an input receptacle and at least one output receptacle;  
a second stage including a high-capacity currency handling device adapted to denominate, count, and sort currency bills, the high-capacity device having multiple output receptacles;  
25 a third stage including a plurality of compact currency handling devices adapted to count currency bills, the compact devices having an input receptacle and at least one output receptacle; and  
a controller operatively coupled with the first, second, and third stages, the controller adapted to receive and to compare information related to the counting of  
30 currency bills at each stage.

47. The system of claim 46 wherein the controller comprises a personal computer adapted to control the operation of the high-capacity device of the second stage.

48. The system of claim 46 wherein each of the compact devices of the first stage includes an operator interface adapted to receive input from an operator of a compact device of the first stage.

5 49. The system of claim 48 wherein the operator interface includes a ten key numeric keypad.

50. The system of claim 46 wherein one or more of the compact devices of the first stage has a single output receptacle.

10

51. The system of claim 46 wherein one or more of the compact devices of the first stage has two output receptacles.

15 52. The system of claim 46 wherein one or more of the compact devices of the first stage, the high-capacity device of the second stage, and the compact devices of the third stage is adapted to evaluate the authenticity of currency bills.

20 53. The system of claim 46 wherein one or more of the compact devices of the first stage, the high-capacity device of the second stage, and the compact devices of the third stage is adapted to discriminate between fit and unfit currency bills according to a predetermined criteria.

54. A method for processing currency bills with a multi-stage currency processing system having a first, second, and third stage, the method comprising:  
 25 receiving one or more deposits including currency bills at the first stage;  
 denominating and counting the received currency bills using at least one compact currency handling device at the first stage;  
 receiving currency bills denominated and counted in the first stage at the second stage;  
 30 denominating, counting, and sorting the currency bills received at the second stage using a high-capacity currency handling device;  
 receiving currency bills denominated, counted, and sorted in the second stage at the third stage;



counting the currency bills received at the third stage using a compact currency handling device; and

comparing information related to the counting of currency at each of the first, second, and third stages with a controller interfaced with each of the at least one  
 5 compact currency handling device of the first stage, the high-capacity currency handling device of the second stage, and the at least one compact currency handling device of the third stage.

55. The method of claim 54 wherein said controller comprises a personal  
 10 computer adapted to control the operation of the high-capacity currency handling device of the second stage.

56. The method of claim 54 further comprising authenticating currency bills with one or more of the at least one compact currency handling device of the first  
 15 stage, the high-capacity currency handling device of the second stage, and the at least one compact currency handling device of the third stage.

57. The method of claim 54 wherein the at least one compact currency handling device of the first stage includes an operator interface, the method further  
 20 comprising receiving input, at the first stage, indicative of an account number, a declared balance, the date, and at least one additional data entry field.

58. The method of claim 57 wherein the at least one additional data entry field includes at least one of a checks total data entry field, a credit card total data  
 25 entry field, or at least one other total data entry field.

59. The method of claim 54 wherein comparing further comprises comparing a first count of the one or more deposits of currency bills received at the first stage determined at the first stage to a second count of the one or more deposits  
 30 of currency bills received at the second determined at the second stage.

60. The method of claim 54 wherein sorting the currency bills received at the second stage further comprises sorting received currency bills by denomination.

61. The method of claim 60 wherein sorting further compressing transporting the currency bills to a plurality of storage cassettes associated with the plurality of output receptacles of the high-capacity currency handling device, each of the plurality of output receptacles corresponding to a specific one of a plurality of  
5 denominations of currency bills.

62. The method of claim 60 further comprising:  
transferring currency bills sorted by denomination at the second stage to the third stage; and  
10 verifying the count of the currency bills obtained at the second stage with the compact currency handling device of the third stage.

63. The method of claim 62 further comprising at the third stage, following the verifying at the third stage, strapping groups of a predetermined number of  
15 currency bills.

64. The method of claim 54 further comprising comparing currency totals for each of the first, second, and third stages.

20 65. The method of claim 54 further comprising, at the first stage, summarizing deposit totals into one or more of day totals, shift totals, customer totals, teller totals, and batch totals.

66. The method of claim 54 wherein each of the one or more compact  
25 currency handling devices of the first stage is associated with a teller station at a bank.

67. The method of claim 66 further comprising summarizing the total amount of currency processed by each teller station with the controller.

30 68. The method of claim 54 further comprising maintaining a detailed summary of subtotals of currency delivered from the first stage to the second stage.

69. The method of claim 54 further comprising:

determining the total values of currency processed by denomination at the second stage; and

sending the total values of currency processed by denomination at the second stage to the controller.

5

70. A multiple-stage currency processing system, comprising:

a first currency processing stage for receiving account deposits including currency bills, the first stage including a plurality of first stage currency processing devices each being adapted to denominate currency bills, each first stage device being adapted to output a first batch of currency bills, each first batch having an associated first total corresponding to the value of the currency bills in the respective first batch;

a second currency processing stage for receiving first batches from the first stage, the second stage including at least one second stage currency processing device having a plurality of output receptacles, the at least one second stage currency processing device being adapted to denominate currency bills and to sort currency bills of the received first batches into a plurality of second batches, the at least one second stage device adapted to determine a second total associated with each first batch processed by the at least one second stage device, the second total corresponding to the value of the currency bills in the first batch processed by the at least one second stage device, each second batch having an associated third total corresponding to the value of the currency bills in the respective second batch;

a third currency processing stage for receiving the second batches from the second stage, the third stage having a plurality of third stage currency processing devices being adapted to count currency bills of the received second batches, the third stage devices being adapted to determine a fourth total associated with each second batch processed by the third stage devices, each fourth total corresponding to the value of the currency bills in the respective second batch processed by third stage devices; and

a central processing unit communicatively linked to each of the first, second, and third stage currency processing devices, the central processing unit being adapted to compare the first totals to the second totals and to compare the third totals to the fourth totals.

71. A method for processing currency bills with a multiple-stage currency processing system comprising a first stage including a plurality of first stage currency processing devices having at least one output receptacle, a second currency processing stage including at least one currency processing device having a plurality of output  
 5 receptacles, and a third currency processing stage including a plurality of currency processing devices having at least one output receptacle, the first stage devices, the second stage devices, and the third stage devices being communicatively linked to a central computer, the method comprising:

receiving deposits including currency bills to be processed in the first currency  
 10 processing stage;

denominating the received currency bills with one or more of the first stage devices;

determining the value of the currency bills in each received deposit, each deposit having an associated first total corresponding to the value of currency bills in  
 15 the deposit;

assigning a first batch number to each deposit;

transmitting, to the central computer, the first batch number and corresponding first total for each deposit received in the first stage;

receiving one or more deposits from the first currency processing stage in the  
 20 second currency processing stage;

entering the first batch number for each deposit into an operator interface communicatively linked to the central computer;

denominating the currency bills of each received first batch with the at least one second stage currency processing device;

25 determining a second total for each deposit received in the second stage with the at least one second stage currency processing device, the second total corresponding to the value of the currency bills in the deposit;

comparing the first total to the second total;

30 sorting currency bills of each deposit received from the first stage with the at least one second stage currency processing device into a plurality of batches, each batch having an associated third total corresponding to the value of currency bills in the batch,

assigning a second batch number to each batch;

transmitting, to the central computer, the second batch number and corresponding third total for each batch;

receiving one or more batches in the third currency processing stage;

entering the second batch number for each deposit into an operator interface  
5 communicatively linked to a central computer;

counting the currency bills of each received batch with one or more of the plurality of third stage currency processing devices;

determining a fourth total for each received second batch with the one or more third stage currency processing devices, the fourth total corresponding to the value of  
10 the currency bills in the second batch; and

comparing the third total to the fourth total.

72. The method of claim 70 wherein transmitting further comprises transmitting information selected from the group comprising data indicative of an  
15 operator of one of the plurality of first stage devices, data indicative of the time a deposit is received by the first currency processing stage, data indicative of the date a deposit is received by the first currency processing stage, data indicative of the particular one of the first stage devices that processes a received deposit, data indicative of an account number of a customer making a deposit, and data indicative  
20 of the identity of a customer making a deposit.

73. The method of claim 70 wherein counting the currency bills of each received batch with one or more of the plurality of third stage currency processing devices further comprises suspending operation of the third stage device after a  
25 predetermined number of currency bills have been transported to an output receptacle of the third stage device.

74. The method of claim 72 further comprising resuming operation upon receipt of operator input.  
30

75. A multiple-stage currency processing system, comprising:  
a first currency processing stage for receiving customer deposits including currency bills, the first currency processing stage including a plurality of first stage currency processing devices each being adapted to denominate currency bills, the first

currency processing stage being adapted output a plurality of first batches of currency bills, each of the first batches corresponding to the currency bills processed by an operator of the first currency processing stage during a predetermined time period, each first batch having an associated first total corresponding to the value of the  
 5 currency bills in the respective first batch;

a second currency processing stage for receiving first batches from the first stage, the second stage including at least one second stage currency processing device having a plurality of output receptacles, the at least one second stage currency processing device being adapted to denominate currency bills and to sort currency  
 10 bills of the received first batches into a plurality of second batches, the at least one second stage device adapted to determine a second total associated with each first batch processed by the at least one second stage device, the second total corresponding to the value of the currency bills in the first batch processed by the at least one second stage device, each second batch having an associated third total  
 15 corresponding to the value of the currency bills in the respective second batch;

a third currency processing stage for receiving the second batches from the second stage, the third stage having a plurality of third stage currency processing devices being adapted to count currency bills of the received second batches, the third stage devices being adapted to determine a fourth total associated with each second  
 20 batch processed by the third stage devices, each fourth total corresponding to the value of the currency bills in the respective second batch processed by third stage devices; and

a central processing unit communicatively linked to each of the first, second and third stage currency processing devices, the central processing unit being adapted to  
 25 compare first totals to second totals, the central processing unit being adapted to compare third totals to fourth totals.

76. The currency processing system of claim 74 wherein the predetermined time period is selected from the group comprising one day, one hour, a  
 30 half day, a teller shift, and half a teller shift.

77. The currency processing system of claim 75 wherein each of the third stage devices is adapted to suspend operation after a predetermined number of currency bills have been transported to an output receptacle of the third stage device, the third

stage device being adapted to resume operation upon receipt of input from an operator of the third stage device.